

WHAT IS CLAIMED IS:

1. A wavelength-division-multiplexed passive optical network comprising:
a central office in which a multi-wavelength lasing source is located;
5 a plurality of subscriber terminals for transmitting an upward signal using a reflected signal of a multi-wavelength signal transmitted from the central office; and
a local office disposed between the central office and the subscriber terminals via optical fibers for demultiplexing the multi-wavelength signal transmitted from the central office and for multiplexing signals from each of the subscriber terminals.
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2. A wavelength-division-multiplexed passive optical network as claimed in claim 1, wherein the central office comprises:
a first optical amplifier for generating amplified spontaneous emission noise;
a multiplexing/demultiplexing device having a first input/output terminal and a
15 plurality of upward signal output terminals at a first side portion so as to receive the amplified spontaneous emission noise and to output a multi-wavelength lasing light, and a plurality of second input/output terminals and an upward signal input terminal for a multi-wavelength lasing light generation at the first side portion so as to output a multi-wavelength lasing light multiplexed in response to the input of the amplified spontaneous
20 emission noise and to demultiplex and to output the upward signal in response to the input of the upward signal;
a plurality of upward signal receivers coupled to the upward signal output

terminals at the first side portion of the multiplexing/demultiplexing device in one-to-one correspondence;

a plurality of reflection means coupled in one-to-one correspondence to the second input/output terminals at the first side portion of the multiplexing/demultiplexing device, so
5 as to input demultiplexed signals outputted through the second input/output terminals back to the second input/output terminals; and

a circulator for outputting a multi-wavelength lasing light inputted from the multiplexing/demultiplexing device to the local office and transmitting an upward signal inputted from the local office to the upward signal input terminal of the
10 multiplexing/demultiplexing device.

3. A wavelength-division-multiplexed passive optical network as claimed in claim 2, wherein the multiplexing/demultiplexing device is an $N \times N$ waveguide grating router.

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4. A wavelength-division-multiplexed passive optical network as claimed in claim 2, wherein the plurality of reflection means are mirrors.

5. A wavelength-division-multiplexed passive optical network as claimed in
20 claim 2, wherein the central office further comprises an external modulator for modulating a multi-wavelength lasing light outputted from the multiplexing/demultiplexing device on the basis of predetermined broadcasting service signals and for outputting the modulated

signal to the circulator.

6. A wavelength-division-multiplexed passive optical network as claimed in claim 5, wherein the external modulator is a LiNbO₃ modulator.

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7. A wavelength-division-multiplexed passive optical network as claimed in claim 5, wherein the external modulator is an electro-absorption modulator.

8. A wavelength-division-multiplexed passive optical network as claimed in claim 5, wherein the external modulator is a semiconductor optical amplifier.

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9. A wavelength-division-multiplexed passive optical network as claimed in claim 1, wherein the subscriber terminal includes a reflective optical amplification means.

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10. A wavelength-division-multiplexed passive optical network as claimed in claim 9, wherein the reflective optical amplification means is a reflective semiconductor optical amplifier.

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11. A wavelength-division-multiplexed passive optical network as claimed in claim 10, wherein the reflective semiconductor optical amplifier comprises an anti-reflection coating face formed on one side, a high-reflection coating face formed on another side, and a gain medium formed between the anti-reflection coating face and the high-reflection coating face, so that the semiconductor optical amplifier total-reflects a signal inputted through the anti-reflection coating face by the high-reflection coating face and outputs the total-reflected signal.

12. A wavelength-division-multiplexed passive optical network as claimed in claim 11, wherein the semiconductor optical amplifier further amplifies and modulates the signal when the signal passes the gain medium.

13. A wavelength-division-multiplexed passive optical network as claimed in claim 9, wherein the subscriber terminal further comprises an optical distributor and a broadcasting data optical receiver so as to receive a broadcasting service signal, the optical distributor distributing downward signals inputted from the local office to the reflective optical amplification means and the broadcasting data optical receiver.